ATTACHMENT C: TESTING AND MONITORING PLAN

Facility name:	Archer Daniels Midland, CCS#1 Well IL-115-6A-0002
Facility contact:	Mr. Mark Burau, Plant Manager, 4666 Faries Parkway, Decatur, IL (217) 424-5750, mark.burau@adm.com
Well location:	Decatur, Macon County, IL; 39° 52' 37.06469" N, 88 ° 53' 36.25685" W

Injection phase Testing and Monitoring was conducted under the Illinois Environmental Protection Agency's permit (Permit No.: UIC-012-ADM). Post-Injection Site Care Testing and Monitoring is captured in Attachment E of this permit.

ATTACHMENT F: EMERGENCY AND REMEDIAL RESPONSE PLAN

This plan is provided to meet the requirements of 40 CFR 146.94. As steps to prevent unexpected carbon dioxide (CO_2) movement have already been undertaken in accordance with a risk analysis and under an injection well permit issued by Illinois Environmental Protection Agency (IEPA Permit No.: UIC-012-ADM), this plan is about actions to be taken, and to be prepared to take, if unexpected movement or any other emergency events occur during the post-injection site care period of the CCS#1 Illinois Basin-Decatur Project (IBDP).

Facility Name: Archer Daniels Midland, CCS#1 Well
IL-115-6A-0002

Facility Contacts: A site-specific list of facility contacts will be developed and maintained during the life of the project.

Injection Well Location: Decatur, Macon County, Illinois
39° 52' 37.06469" N, 88° 53' 36.25685" W

This emergency and remedial response plan (ERRP) describes actions that the owner/operator (ADM) shall take to address movement of the injection fluid or formation fluids in a manner that may endanger an underground source of drinking water (USDW) during the post-injection site care period for the IBDP CCS#1 well.

The CCS#1 well is related to CCS#2, which is expected to begin injection operations in 2015. Delineation of the area of review (AoR) for CCS#1 incorporates injection activities at CCS#2 (i.e., the two wells will create a single CO_2 plume and pressure front). Therefore, an emergency event related to either well will require a coordinated response.

If ADM obtains evidence that the injected CO_2 stream and/or associated pressure front may cause an endangerment to a USDW, ADM must perform the following actions:

1. Take all steps reasonably necessary to identify and characterize any release.
2. Notify the permitting agency (UIC Program Director) of the emergency event within 24 hours.
3. Implement applicable portions of the approved ERRP.

Part 1: Local Resources and Infrastructure

Resources in the vicinity of the IBDP CCS#1 well that may be impacted as a result of an emergency event at the project site include: USDWs; potable water wells; the Sangamon River; Bois Du Sangamon Nature Preserve; and Lake Decatur.

Infrastructure in the vicinity of the IBDP CCS#1 well that may be impacted as a result of an emergency at the project site include: the wellhead; Richland Community College structures; Heartland Community Church; residential areas; commercial properties; recreational facilities; and ADM facilities. A map of the local area is provided as Figure F-2 at the end of this plan.

Part 2: Potential Risk Scenarios

The following events related to the IBDP CCS#1 well could potentially result in an emergency response:

- Well integrity failure at CCS#1, a monitoring well for CCS#2:
- A natural disaster (e.g., earthquake, tornado, lightning strike);
- Fluid (e.g. brine) or CO_2 leakage to a USDW; or
- Induced seismic event.

Response actions will depend on the severity of the event(s) triggering an emergency response. "Emergency events" are categorized as follows:

TABLE F-1. DEGREES OF RISK FOR EMERGENCY EVENTS

Emergency Condition	Definition
Major Emergency	Event poses immediate substantial risk to human health, resources, or infrastructure. Emergency actions involving local authorities (evacuation or isolation of areas) should be initiated.
Serious Emergency	Event poses potential serious (or significant) near term risk to human health, resources, or infrastructure if conditions worsen or no response actions taken.
Minor Emergency	Event poses no immediate risk to human health, resources, or infrastructure.

Part 3: Emergency Identification and Response Actions

Steps to identify, characterize, and respond to the event will be dependent on the specific issue identified, and the severity of the event. The potential risk scenarios identified in Part 2 are detailed below.

In the event of an emergency requiring outside assistance, the project contact lead shall call the ADM Security Dispatch at (217) 424-4444 and ADM Corporate Communications at (217) 424-5413.

Well Integrity Failure. A loss of integrity at CCS#1, a monitoring well for CCS#2, may endanger USDWs at the IBDP site. Integrity loss may have occurred if the mechanical integrity test results indicate a loss of mechanical integrity.

Response Actions:

- Immediately notify the ADM plant superintendent or designee.
- Notify the UIC Program Director within 24 hours of the emergency event, per 40 CFR 146.91(c).
- The plant superintendent will make an initial assessment of the situation and determine which other project personnel to notify.
- Project contacts will determine the severity of the event, based on the information available, within 24 hours of notification.
- For a Major or Serious Emergency:
  - Shut in well (close flow valve), if applicable.
  - Vent CO_2 from surface facilities, if applicable.
  - Limit facility access to authorized personnel only.
  - Communicate with ADM personnel and local authorities to initiate evacuation plans, as necessary.
  - Monitor well pressure, temperature, and annulus pressure to verify integrity loss and determine the cause and extent of failure; identify and implement appropriate remedial actions to repair damage to the well (in consultation with the UIC Program Director).
  - If contamination is detected, identify and implement appropriate remedial actions (in consultation with the UIC Program Director).
- For a Minor Emergency:
  - Conduct assessment to determine whether there has been a loss of mechanical integrity.
  - If there has been a loss of mechanical integrity:.
    - Shut in well (close flow valve), if applicable.
    - Vent CO_2 from surface facilities, if applicable.
  - Monitor well pressure, temperature, and annulus pressure to verify integrity loss and determine the cause and extent of failure; identify and, if necessary, implement appropriate remedial actions (in consultation with the UIC Program Director).

Potential Brine or CO_2 Leakage to USDW. Elevated concentrations of indicator parameter(s) in groundwater sample(s) or other evidence of fluid (brine) or CO_2 leakage into a USDW.

Response Actions:

- Immediately notify the ADM plant superintendent or designee.
- Notify the UIC Program Director within 24 hours of the emergency event, per 40 CFR 146.91(c).
- The plant superintendent will make an initial assessment of the situation and determine which other project personnel to notify.
- Project contacts will determine the severity of the event, based on the information available, within 24 hours of notification.
- For all Emergencies (Major, Serious, or Minor):
  - Collect a confirmation sample(s) of groundwater and analyze for indicator parameters (a list of potential indictors is listed in Attachment E, the Post-Injection Site Care and Site Closure Plan, Table 3).
  - If the presence of indicator parameters is confirmed, develop (in consultation with the UIC Program Director) a case-specific work plan to:
    - Install additional groundwater monitoring points near the impacted groundwater well(s) to delineate the extent of impact, and
    - Remediate unacceptable impacts to the impacted USDW.
  - Arrange for an alternate potable water supply, if the USDW was being utilized and has been caused to exceed drinking water standards.
  - Proceed with efforts to remediate USDWs to mitigate any unsafe conditions (e.g., install system to intercept/extract brine or CO_2 or "pump and treat" to aerate CO_2-laden water).
  - Continue groundwater remediation and monitoring on a frequent basis (frequency to be determined by ADM and the UIC Program Director) until unacceptable adverse USDW impact has been fully addressed.

Natural Disaster. Well problems (integrity loss, leakage, or malfunction) may arise as a result of a natural disaster impacting normal operations at the site. An earthquake may disturb surface and/or subsurface facilities; and weather-related disasters (e.g., tornado or lightning strike) may impact surface facilities.

Response Actions:

- Immediately notify the ADM plant superintendent or designee.
- Notify the UIC Program Director within 24 hours of the emergency event, per 40 CFR 146.91(c). The plant superintendent will make an initial assessment of the situation and determine which other project personnel to notify.
- Project contacts will determine the severity of the event, based on the information available, within 24 hours of notification.
- For a Major or Serious Emergency:
  - Limit facility access to authorized personnel only.
  - Communicate with ADM personnel and local authorities to initiate evacuation plans, as necessary.
  - Monitor well pressure, temperature, and annulus pressure to verify well status and determine the cause and extent of any failure.
  - Determine if any leaks to ground water or surface water occurred.
  - If contamination or endangerment is detected, identify and implement appropriate remedial actions (in consultation with the UIC Program Director).
- For a Minor Emergency:
  - Conduct assessment to determine whether there has been a loss of mechanical integrity.
  - Limit facility access to authorized personnel only.
  - Monitor well pressure, temperature, and annulus pressure to verify integrity loss and determine the cause and extent of any failure.
  - Identify and, if necessary, implement appropriate remedial actions (in consultation with the UIC Program Director).

Induced Seismic Event. Induced seismic events typically refer to minor seismic events that are caused by human activity which alters the stresses and fluid pressures in the earth's crust. Induced seismicity could potentially result from the injection of fluids into subsurface formations that lubricate and or change the stress state of pre-existing faults which causes fault plane movement and energy release. Most induced seismic events are extremely small (microseismic) but in some instances are great enough to be felt by humans. Case histories of induced seismic events associated with fluid disposal wells show seismic events as far away as about 10 to 12 km (6.2 to 7.4 miles). Based on the project operating conditions, it is highly unlikely that injection operations would ever induce a seismic event outside an eight (8) mile radius from the wellhead. Therefore this portion of the response plan is developed for any seismic event with an epicenter within a eight (8) mile radius of the injection well.

To monitor the area for seismicity, the site has installed five (5) surface seismic monitoring stations and three (3) borehole monitoring stations that continuously record the site's seismic activity. In addition to these stations, the USGS has deployed a network of nine (9) surface seismic monitoring stations and three (3) borehole monitoring stations. Based on the periodic analysis of the monitoring data, observed level of seismic activity, and local reporting of felt events, the site will be assigned an operating state. The operating state is determined using threshold criteria which correspond to the site's potential risk and level of seismic activity. The operating state provides operating personnel information about the potential risk of further seismic activity and guides them through a series of response actions. In the following table the ADM Decatur Seismic Monitoring System is presented. The table corresponds each level of operating status with the threshold conditions and operational response actions.

Table F-2a. ADM Decatur Seismic Monitoring System [1]

Operating State	Threshold Condition	Response Action
Green	Seismic events less than or equal to M1.5 [2]	1. Continue site activities per permit conditions.
Yellow	Five (5) or more seismic events within a 30 day period having a magnitude greater than M1.5 [2] but less than or equal to M2.0[2].	1. Continue site activities per permit conditions. 2. Within 24 hours of the incident, notify the UIC Program Director and ISGS of the operating status of the facility.
Orange	Seismic event greater than M1.5 [2]; and Local observation or felt report [3].	1. Continue site activities per permit conditions. 2. Within 24 hours of the incident, notify the UIC Program Director, ISGS, and ADM Communications of the operating status of the facility. 3. Review seismic and operational data. 4. Report findings to the UIC Program Director and issue corrective actions [5].
	Seismic event greater than M2.0 [2] and no felt report	

1. Seismic events < M1.0 with an epicenter within an 8 mile radius of the injection well.
2. Determined by the local ADM or USGS seismic monitoring stations or reported by the USGS National Earthquake Information Center using the national seismic network.
3. Confirmed by local reports of felt ground motion or reported on the USGS "Did You Feel It?" reporting system.
4. Onset of damage is defined as cosmetic damage to structures – such as bricks dislodged from chimneys and parapet walls, broken windows, and fallen objects from walls, shelves, and cabinets.
5. Within 25 business days (five weeks) of change in operating state.

Table F-2b. ADM Decatur Seismic Monitoring System [1]

Operating State	Threshold Condition	Response Action
Magenta	Seismic event greater than M2.0 [2]; and Local observation or report [3].	1. Within 24 hours of the incident, notify the UIC Program Director, ISGS, and ADM Communications of the operating status of the facility. 2. Limit facility access to authorized personnel only. 3. Communicate with ADM personnel and local authorities to initiate evacuation plans, as necessary. 4. Monitor well pressure, temperature, and annulus pressure to verify well status and determine the cause and extent of any failure; identify and implement appropriate remedial actions (in consultation with the UIC Program Director). 5. Determine if leaks to ground water or surface water occurred. 6. If USDW contamination is detected, a. Notify the UIC Program Director within 24 hours of the determination. b. Identify and implement appropriate remedial actions (in consultation with the UIC Program Director). 7. Review seismic and other site data. 8. Report findings to the UIC Program Director and issue corrective actions [5].

1. Seismic events < M1.0 with an epicenter within an 8 mile radius of the injection well.
2. Determined by the local ADM or USGS seismic monitoring stations or reported by the USGS National Earthquake Information Center using the national seismic network.
3. Confirmed by local reports of felt ground motion or reported on the USGS "Did You Feel It?" reporting system.
4. Onset of damage is defined as cosmetic damage to structures – such as bricks dislodged from chimneys and parapet walls, broken windows, and fallen objects from walls, shelves, and cabinets.
5. Within 25 business days (five weeks) of change in operating state.

Table F-2c. ADM Decatur Seismic Monitoring System [1]

Operating State	Threshold Condition	Response Action
Red	Seismic event greater than M2.0 [2]; Local observation or report [3]; and Local report and confirmation of damage [4].	1. Within 24 hours of the incident, notify the UIC Program Director, ISGS, and ADM Communications of the operating status of the facility. 2. Limit facility access to authorized personnel only. 3. Communicate with ADM personnel and local authorities to initiate evacuation plans, as necessary. 4. Monitor well pressure, temperature, and annulus pressure to verify well status and determine the cause and extent of any failure; identify and implement appropriate remedial actions (in consultation with the UIC Program Director). 5. Determine if leaks to ground water or surface water occurred. 6. If USDW contamination is detected, a. Notify the UIC Program Director within 24 hours of the determination. b. Identify and implement appropriate remedial actions (in consultation with the UIC Program Director). 7. Review seismic and operational data. 8. Report findings to the UIC Program Director and issue corrective actions [5].
	Seismic event >M3.5 [2]	

1. Seismic events < M1.0 with an epicenter within an 8 mile radius of the injection well.
2. Determined by the local ADM or USGS seismic monitoring stations or reported by the USGS National Earthquake Information Center using the national seismic network.
3. Confirmed by local reports of felt ground motion or reported on the USGS "Did You Feel It?" reporting system.
4. Onset of damage is defined as cosmetic damage to structures – such as bricks dislodged from chimneys and parapet walls, broken windows, and fallen objects from walls, shelves, and cabinets.
5. Within 25 business days (five weeks) of change in operating state.

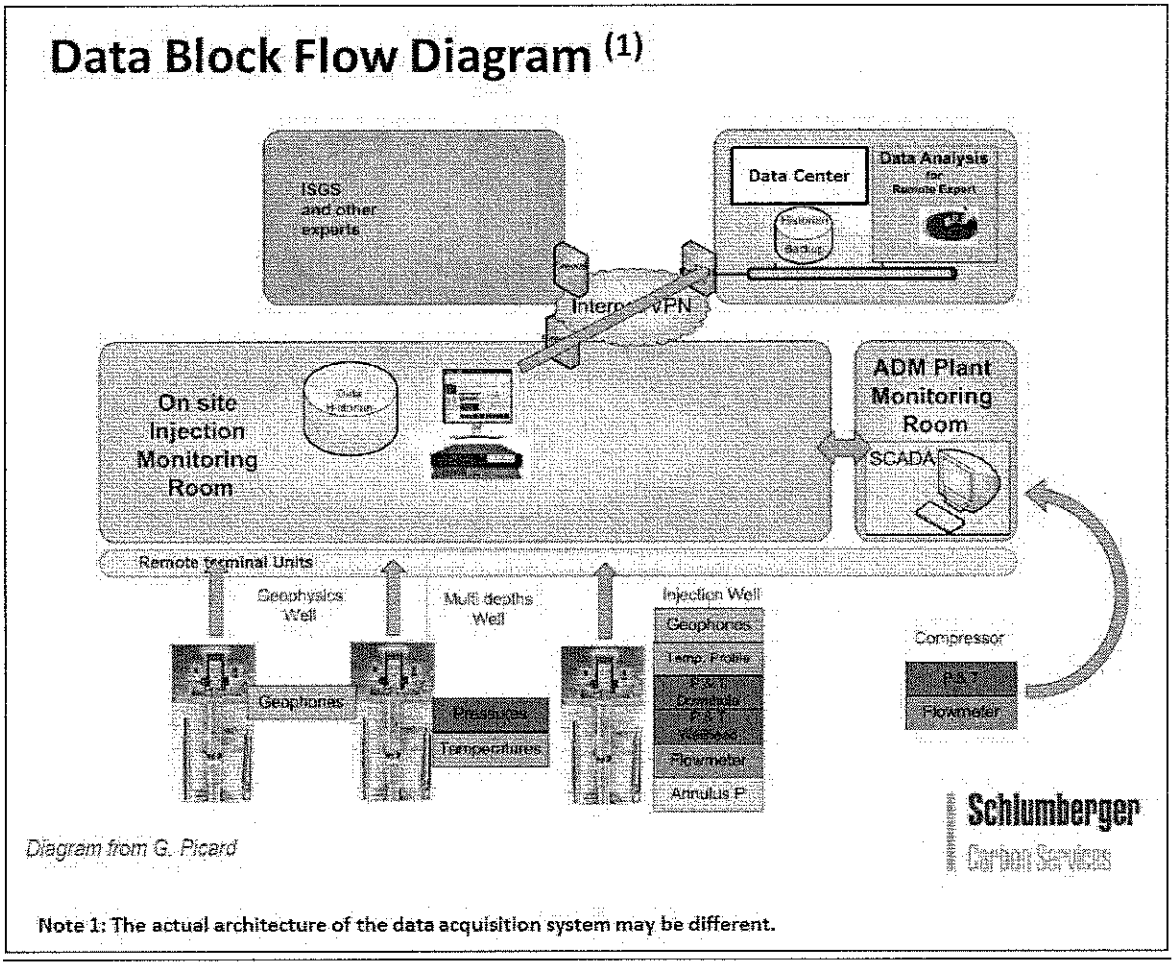

Figure F-1. The process by which seismic data are acquired, transmitted, processed, and evaluated by ADM to support the process.

1. Seismic data is recorded in real time from all stations.
2. Data from specific borehole and surface stations is transferred to a central data acquisition system where it is processed to determine the magnitude of the seismic event.
3. An email alert notification is sent out for events with magnitudes greater than M1.0.
4. If the seismic activity results in the site's operational state escalating above yellow, additional data from remote seismic stations will be retrieved.
5. The seismic data will undergo additional processing to refine the magnitude and determine location of the event(s).
6. The data will be evaluated by subject matter experts and a report of findings and recommendations will be issued within 25 business days.

Part 4: Response Personnel and Equipment

Site personnel, project personnel, and local authorities will be relied upon to implement this ERRP. Portions of the AoR are located within the limits of the City of Decatur and other portions are outside of the city limits. Therefore, both city and county emergency responders (as well as state agencies) may need to be notified in the event of an emergency.

Site personnel to be notified (not listed in order of notification):

1. ***ADM Project Engineer(s)***
2. ***ADM Plant Safety Manager(s)***
3. ***ADM Environmental Manager(s)***
4. ***ADM Plant Manager***
5. ***ADM Plant Superintendent***
6. ***ADM Corporate Communications***

A site-specific emergency contact list will be developed and maintained during the life of the project. ADM will provide the current site-specific emergency contact list to the UIC Program Director.

Local Authorities (including but not limited to):

Agency:	**Phone No.**
City of Decatur Police Department	217-424-2711
City of Decatur Fire Department	217-424-2811
Macon County Sheriff	217-424-1311
Illinois State Police	217-786-7107
Illinois Emergency Management Agency	800-782-7860
Macon County Emergency Management Agency	217-424-1327
Bodine Environmental Services	800-637-2379
UIC Program Director (US EPA Region V)	312-886-6234
US EPA National Response Center (24 hr)	800-424-8802
Illinois State Geological Survey	217-244-8389, 4068 217-649-1744

Equipment needed in the event of an emergency and remedial response will vary, depending on the triggering emergency event. Response actions will generally not require specialized equipment to implement. Where specialized equipment (such as a drilling rig or logging equipment) is required, the designated Subcontractor Project Manager shall be responsible for its procurement.

Part 5: Emergency Communications Plan

ADM will communicate to the public about any event that requires an emergency response, in consultation with the UIC Program Director.

In the event of an emergency requiring outside assistance, the project contact lead shall call the ADM Security Dispatch at (217) 424-4444 and ADM Corporate Communications at (217) 424-5413.

- Emergency communications with the public will be handled by ADM Corporate Communications.
- ADM Corporate Communications, in consultation with the UIC Program Director, will determine the method, frequency, and extent of public communication based upon the emergency event's severity and impact to the public.
- ADM will describe what happened, any impacts to the environment or other local resources, how the event was investigated, what responses were taken, and the status of the response (including any updates, as necessary).
- ADM Corporate Communications will manage all ADM media communications with the public (through either interview, press release, Web posting, or other) in the event of an emergency situation related to the project.
- The individual to be designated by ADM will be the first contact during an emergency event.
- This individual will contact the crisis communication team as appropriate. Emergency responses to the media from ADM will be dealt with ONLY by the personnel so designated by ADM.
- Those individuals should try to be reachable 24 hours a day for contact in the event of an emergency.

In the event that anyone else at ADM is contacted to comment on any situation deemed an "emergency event," the media contact should be directed to ADM's 24/7 media line at 217-424-5413 or Media@adm.com.

Part 6: Plan Review

This ERRP shall be reviewed:

- at least once every five (5) years following its approval by the permitting agency,
- within one (1) year of an AoR re-evaluation,
- within a prescribed period (to be determined by the permitting agency) following any significant changes to the facility or an emergency event, or
- as required by the permitting agency.

If the review indicates that no amendments to the ERRP are necessary, provide the permitting agency with the documentation supporting the "no amendment necessary" determination.

If the review indicates that amendments to the ERRP are necessary, amendments shall be made and submitted to the permitting agency within six (6) months following an event that initiates the ERRP review procedure.

Part 7: Staff Training and Exercise Procedures

ADM will integrate the ERRP into the plant specific standard operating procedures and training program as described in the SOP entitled 180.60.ENV.130 "*Environmental Training, Awareness and Competence.*" Periodic training will be provided, not less than annually, to well operators, plant safety and environmental personnel, the plant manager, plant superintendent, and corporate communications. The training plan will document that the above listed personnel have been trained and possess the required skills to perform their relevant emergency response activities described in the ERRP.

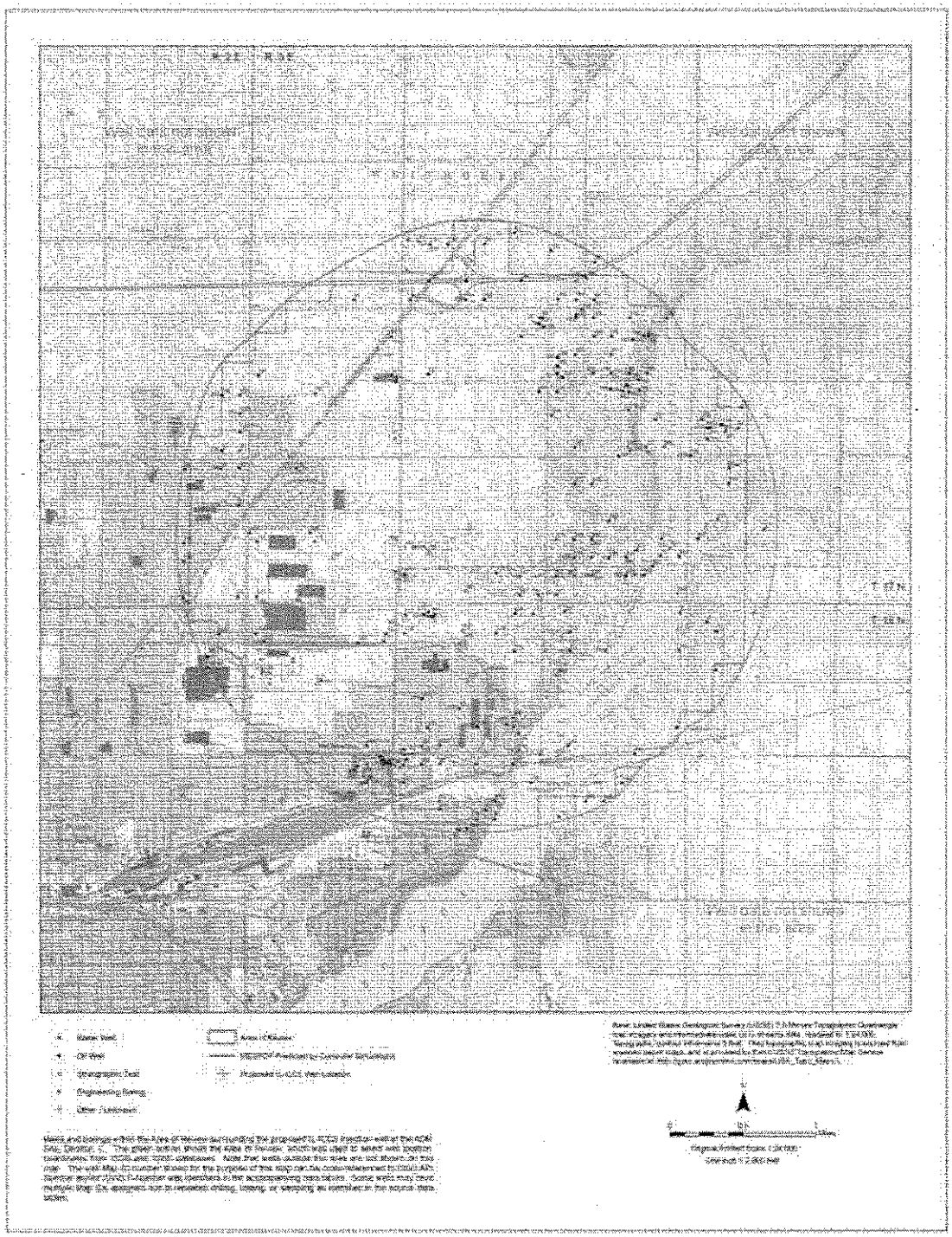

Figure F-2. Local area map for the IBDP CCS#1. Emergency & remedial response activities will most likely be within the AoR highlighted on the map. Source: ISGS and ISWS well databases, current as of May 10, 2011.